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Structural and Dynamical Study of a Monodisperse Hard-Sphere Glass Former PATRICK CHARBONNEAU, Duke University, ATSUSHI IKEDA, Tsukuba University, JACOBUS A. VAN MEEL, FOM Institute for Atomic and Molecular Physics, KUNIMASA MIYAZAKI, Tsukuba University — There exists a variety of theories of jamming and of the glass transition, and many more numerical models. But because the models need built-in complexity to prevent crystallization, comparisons with the theories are sometimes difficult. We address this problem by studying the structure and dynamics of deeply supersaturated monodisperse hard-sphere fluids in four dimension (4D), which have a very low nucleation rate. We examine the predictions of two mean-field treatments of jamming in light of the structural results of the model. We also compare the mode-coupling theory (MCT) of glass formation to the dynamical results. We find MCT to describe this system better than any other structural glass formers in lower dimensions. The reduction in dynamical heterogeneity in 4D suggested by a milder violation of the Stokes-Einstein relation could explain the agreement. These observations are consistent with a dynamical mean-field scenario of the glass transition.

Patrick Charbonneau
Duke University

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